

THE MAHONIAS OF THE PACIFIC STATES

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The late Professor Piper has given a scholarly account (1) of the taxonomic history of Mahonia aquifolium and M. repens, in which he reports the results of critical studies of the peculiar differences in the epidermis of the lower surfaces of the leaflets. He found that these epidermal characters set off M. aquifolium and M. pinnata from the rest of the species. In these two species the epidermal cells of the lower surface of the leaflets are rounded on the back, the enlarged rounded portion conforming in outline with the cell and not evident as distinct papillae. Whereas in M. repens, M. pumila, and related species the lower surface is beset with minute cylindrical papillae. Accompanying this papillate character is the grayish color of the lower surface.

By using this microscopical structure of the epidermis as an additional taxonomic character it is possible to delimit the species of Mahonia more clearly, and the present paper is an attempt to reevaluate and realign the species of the Pacific States, which is one of the chief geographic centers of the genus.

Bud-scales glumaceous, persistent, 15-40 mm. long; filaments unappendaged. 1. M. nervosa.

Bud-scales deciduous, 2-5 mm. long; filaments with a pair of recurved teeth near the apex.

Racemes densely many-flowered; floral bracts triangular-ovate, obtuse or acute; berry oblong-ovoid, blue-black, fleshy.

Epidermis of the lower surface of the leaflets not papillate; upper surface bright green and shining.

Leaflets ovate, mostly obtuse, the lowest pair borne close to the base. 2. M. pinnata.

Leaflets ovate-lanceolate, the lowest pair remote from the base. 3. M. aquifolium.

Epidermis of the lower surface of the leaflets with minute papillae.

Leaflets bright-green and shining above.

Teeth 7-11 on each margin of the leaflets, tipped with slender spines; lower surface of leaflets gray-green. 4. M. piperiana.

Teeth 12-16 on each margin, merely bristle-tipped; lower surface not gray. 5. M. sonnei.

Leaflets dull or gray-green above, grayish beneath.

Teeth small, bristle-tipped, usually 12 or more on a side. 6. M. repens.

Teeth large, tipped with stout spines, usually 5-9 on each margin.

Plants low, 2-5 dm. high; teeth not as long as the body portion of the leaflet. 7. M. pumila.

Plants 1-2 m. high; leaves pale gray-green on both surfaces, strongly undulate and rigid, the teeth about as long as the body portion of the leaflet. 8. M. dictyota.

Racemes loosely 5-7-flowered; floral bracts lanceolate-acuminate; leaflets glaucescent on both surfaces; berries globose, becoming dry.

Leaflets with 2-3 prominent spiny teeth on each margin.

9. M. fremontii.

Leaflets narrow, long-acuminate, with 8 or more bristle-like teeth on each margin. 10. M. nevinii.

1. MAHONIA NERVOSA (Pursh) Nutt. Gen. Pl. 1: 212. 1818.

Berberis nervosa Pursh, Fl. Sept. 219, pl. 5. 1814.

Mahonia glumosa DC. Syst. Veg. 2: 21. 1821.

Odostemon nervosus Rydb., Bull. Torrey Club 33: 141. 1906.

Stems simple, 2-6 dm. high, bearing the leaves in a terminal tuft, the scales of the terminal bud glumaceous, persistent, 2-4 cm. long. Leaves 25-40 cm. long; leaflets 7-21, ovate to ovate-lanceolate, acute, 3-5 cm. long, spinulose-serrate, glossy-green, somewhat palmately nerved; racemes 7-20 cm. long, erect; pedicels 5-8 mm. long; berries glaucous-blue, 8-10 mm. in diameter.

Coniferous forests, Humid Transition Zone; Vancouver Island and British Columbia to Monterey, California. Type locality: The Cascades of the Columbia River.

2. MAHONIA PINNATA (Lag.) Fedde in Engler, Jahrb. 31: 86. 1901.

Berberis pinnata Lag. Elench. Hort. Madr. 6. 1803 (nomen nudum); l.c. 14. 1816.

Mahonia fascicularis DC. Syst. Veg. 2: 19. 1821.

Odostemon fascicularis Abrams in Bull. N. Y. Bot. Gard. 6: 360. 1910.

Stems erect, branching, 3-15 dm. high; leaflets 5-17, commonly 7-9, crowded on the rachis, the lowest pair near the base, glossy green above, scarcely paler beneath, rather thin, spinulose-dentate, the teeth usually 12 or more on each margin; racemes dense, fascicled, 3-5 cm. long.

Wooded slopes or thickets, mainly Upper Sonoran Zone;

California Coast Ranges from Humboldt to Los Angeles Counties. Type locality: Monterey, California.

3. MAHONIA AQUIFOLIUM (Pursh) Nutt. Gen. Pl. 1: 212. 1818.

Berberis aquifolium Pursh, Fl. Sept. 1: 219. 1814.

Odostemon aquifolium Rydb., Bull. Torrey Club 33: 141. 1906.

Odostemon nutkanus (DC.) Rydb. l.c.

Stems erect, 8-20 dm. high, or sometimes dwarfed; leaflets 5-9, the lowest pair distant from the base of the rachis, ovate-lanceolate, 3-7.5 cm. long, with usually 10 or more small spinulose teeth on each margin, bright glossy green above, light green beneath; racemes fascicled, 4-8 cm. long; berries blue and glaucous, on pedicels 10-15 mm. long.

Coniferous woods, Humid Transition Zone; southwestern British Columbia to the Calipooia Mountains, Oregon, also in northwestern Idaho. Type locality: The Cascades of the Columbia River.

4. MAHONIA PIPERIANA Abrams, sp. nov.

Frutex erectus 2-5 dm. altus; foliolis 5-9 frequenter 7, jugo inferiore a petioli basi distante ovato 2.5-6 cm. longis, dentibus 7-9 spinosis.

Stems erect, 2-5 dm. high; leaflets 5-9, commonly 7, the lower pair usually distant from the base of the rachis, ovate, 2.5-6 cm. long, spinose-dentate, with 7-9 teeth on each margin; upper surface glossy green and rather finely reticulate, the lower surface gray-green and papillate; racemes 3-7 cm. long, densely or rather loosely fascicled; berry blue-black, ellipsoid-ovoid.

Usually on thinly wooded slopes, Arid Transition Zone; Jackson and Josephine Counties, Oregon, to Mendocino and northern Lake County, California. Type locality: Along the Pacific Highway, near the Siskiyou summit, Jackson County, Oregon, Abrams and Benson 10176, March 9, 1924. A fruiting specimen was collected in the same vicinity in September, 1927 (Abrams 12136).

Most California botanists have been referring these plants to M. aquifolium, but Piper clearly showed that they were not closely related to that species. He tentatively placed them with the then little understood M. dictyota, a species we now know to be quite different. M. piperiana is fairly common over the range indicated, and is represented in the Dudley Herbarium by thirty-five different collections.

5. MAHONIA SONNEI Abrams, sp. nov.

Frutex 3-5 dm. altus; foliolis 5, jugo inferiore a petioli basi distante ovato-lanceolatis; dentibus utrinque 13-16 spinulosis; racemis congestis paucis elongatis.

Low shrub, 2-5 dm. high; leaflets 5, ovate-lanceolate, 4-8 cm. long, glossy green above, pale beneath but not grayish or very obscurely so, the papillae being rather thinly scattered; racemes densely flowered, 4-7 cm. long; berries blue-black, about 6 mm. long.

The type was collected on rocky banks of the Truckee River, Nevada County, California, by C. F. Sonne no. 11, August 11, 1884, and April, 1885. It is sheet no. 95828 in the Dudley Herbarium.

This species has long been confused with M. aquifolium which it superficially resembles in the shape of the leaflets and in their shiny green appearance, but the small numerous teeth and the papillate lower surface clearly indicate that its closest affinities are with M. repens.

6. MAHONIA REPENS (Lindl.) G. Don, Gen. Hist. Pl. 1: 118. 1831.

Berberis repens Lindl. Bot. Reg. 14: pl. 1176. 1828.

Odoestemon repens Cockerell in Daniels, Fl. Boulder Colo.

125. 1911.

Stems creeping and stoloniferous, 1-2 dm. high; leaflets 3-7, oval or rarely ovate, 3-9 cm. long, plane or nearly so, dull green above, grayish-green beneath and papillate with minute microscopic protuberances; teeth usually 12 or more on a side, small and merely bristle-tipped; racemes densely many-flowered; berry ellipsoid-globose, 7-8 mm. long.

Open pine forests, Arid Transition Zone; eastern British Columbia south along the eastern slopes of the Cascade Mountains to northeastern California, and east to Alberta, Nebraska, and New Mexico. Type locality: probably Montana.

7. MAHONIA PUMILA (Greene) Fedde in Engler, Bot. Jahrb. 31: 82. 1901.

Berberis pumila Greene, Pittonia 2: 161. 1891.

Odoestemon pumilus Heller, Muhlenbergia 7: 139. 1912.

Stem erect, 2-4 dm. high, rarely higher, simple or branched; leaflets 5-9, broadly oblong-ovate, blunt at the apex, dull green and strongly reticulate-veined above, glaucous beneath, undulate and strongly spinose-dentate, the teeth 5-9 on each margin; racemes fascicled, many-flowered; berries blue-black, with a bloom, oblong-ovoid, about 6 mm. long.

Wooded slopes, Upper Sonoran and Arid Transition Zones; Rogue River, southern Oregon, south in the North Coast Ranges and the Sierra Nevada; also the Cuiamaca Mountains, California. Type locality: near Waldo, Oregon.

8. MAHONIA DICTYOTA (Jepson) Fedde in Engler, Bot. Jahrb. 31: 89. 1901.

Berberis dictyota Jepson, Bull. Torrey Club 18: 319. 1891.
Odostemon dictyota Cockerell, Bull. Am. Mus. Nat. Hist. 24: 91. 1901.

Berberis californica Jepson, Fl. Calif. 549. 1921.

Erect shrub, 5-20 dm. high, rather sparsely leafy; leaflets 5-7, broadly oblong to suborbicular in outline, strongly undulate and prominently spinose-toothed with 3-5 teeth on each margin, thick-coriaceous and prominently net-veined on both surfaces, pale green above and glaucous beneath; racemes fasciculate; berries very glaucous, about 5 mm. long.

Dry chaparral ridges, Upper Sonoran Zone; California from the dry interior foothills of the upper Sacramento Valley to San Diego County. Type locality: Marysville Buttes, California.

9. MAHONIA FREMONTII (Torr.) Fedde in Engler, Bot. Jahrb. 31: 89. 1901.

Berberis fremontii Torr. Bot. Mex. Bound. 30. 1859.
Odostemon fremontii Rydb., Bull. Torrey Club 33: 141. 1906.

Erect shrub, with rigid branches, 1-3 m. high; leaflets 3-7, commonly 5, rather narrowly ovate, 15-25 mm. long, coriaceous, pale gray-green on both surfaces, the spiny teeth prominent, usually 3 on each side; racemes terminating the numerous short stubby branchlets, usually 3-5-flowered; bracts acuminate; pedicels slender, 10-16 mm. long; berries becoming inflated and dry.

Dry mountain slopes of the desert regions, Upper Sonoran Zone; southern Nevada to southern Colorado south to Arizona, the deserts of southern California, and adjacent Lower California. Type locality: "On the tributaries of the Rio Virgen", southern Utah.

10. MAHONIA NEVINII (A. Gray) Fedde in Engler, Bot. Jahrb. 31: 102. 1901.

Berberis nevinii A. Gray, Syn. Fl. 1: 69. 1895.
Odostemon nevinii Abrams, Bull. N. Y. Bot. Gard. 6: 359. 1910.

Much branched shrub, 1-2 m. high; leaflets 3 or rarely 5, lanceolate, the lateral 2-3 cm. long, the terminal often

nearly twice as long, gray-green on both surfaces, spinulose-serrate, the teeth numerous, bristle-like; racemes terminating the numerous stubby branchlets, loosely 5-7-flowered; bracts acuminate; berries densely covered with bloom.

Dry sandy washes, Upper Sonoran Zone; a rare species, known only from the eastern end of San Fernando Valley, southern California.

(1) Piper, Charles V. The identification of Berberis aquifolium and Berberis repens. Contr. U. S. Nat. Herb. 20: 437-451, pl. 24-26. 1922.